

## System Analysis & Design Methodologies



CST 270 – System Analysis & Design  
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## Objectives

- Introduce and Explain the Systems Development Life Cycle (SLDC)
- Explain the seven phases of the SLDC including their activities and outcomes
- Discuss the purpose and impact of maintenance over a system's life cycle
- Explain CASE tools and their classification
- Discuss an alternative to SDLC specifically Object-oriented methodologies and discussed choosing an approach

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## Systems Development Life Cycle

- The systems development life cycle (SDLC) is a phased systematic approach to solving business problems
- Developed through the use of a specific cycle of analyst and user activities
  - Each phase has unique user activities

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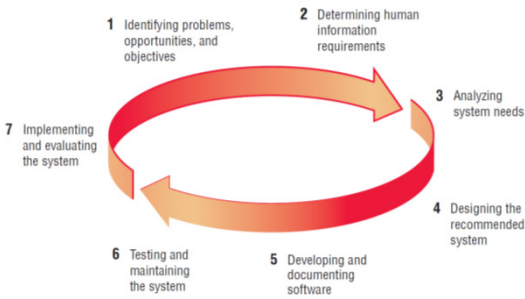
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## The Seven Phases of the SDLC (Fig. 1.3)



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## Incorporating Human-Computer Interaction (HCI) Considerations

- The demand for analysts who are capable of incorporating HCI into the systems development process keeps increasing, as companies begin to realize that the quality of systems and the quality of work life can be improved by taking a human-centered approach at the outset of a project

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## 1: Identifying Problems & Objectives

- Activity:
  - Interviewing user management
  - Summarizing the knowledge obtained
  - Estimating the scope of the project
  - Documenting the results
- Output:
  - Feasibility report containing problem definition and objective summaries from which management can make a decision on whether to proceed with the proposed project

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## 2: Determining Human Information Requirements

- Activity:
  - Interviewing
  - Sampling and investing hard data
  - Questionnaires
  - Observe the decision maker's behavior and environment.
  - Prototyping
  - Learn the who, what, where, when, how, and why of the current system.
- Output:
  - The analyst understands how users accomplish their work when interacting with a computer; and begin to know how to make the new system more useful and usable. The analyst should also know the business functions and have complete information on the people, goals, data, and procedure involved.

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## 3: Analyzing System Needs

- Activity:
  - Create data flow, activity, or sequence diagrams.
  - Complete the data dictionary.
  - Analyze the structured decisions made.
  - Prepare and present the system proposal.
- Output:
  - Recommendation on what, if anything, should be done

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## 4: Designing the System

- Activity:
  - Design procedures for data entry.
  - Design the human-computer interface.
  - Design system controls.
  - Design database and/or files.
  - Design backup procedures.
- Output
  - Model of the actual system

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## 5: Developing and Documenting Software

- Activity:
  - System analyst works with programmers to develop any original software.
  - Works with users to develop effective documentation.
  - Programmers design, code, and remove syntactical errors from computer programs.
  - Document software with help files, procedure manuals, and Web sites with Frequently Asked Questions.
- Output:
  - Computer programs
  - System documentation

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## 6: Testing and Maintaining the System

- Activity:
  - Test the information system.
  - System maintenance.
  - Maintenance documentation.
- Output:
  - Problems, if any
  - Updated programs
  - Documentation

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## 7: Implementing and Evaluating the System

- Activity:
  - Train users.
  - Analyst plans smooth conversion from old system to new system.
  - Review and evaluate system.
- Output:
  - Trained personnel
  - Installed system

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## The Impact of Maintenance

- Maintenance is performed for two reasons:
  - Removing software errors
  - Enhancing existing software
- Over time the cost of continued maintenance will be greater than that of creating an entirely new system
  - At that point it becomes more feasible to perform a new systems study.

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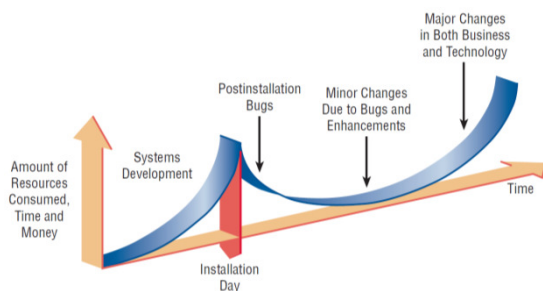
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## Resource Consumption over the life of a Typical System (Fig. 1.3)



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## Approaches to Structured Analysis and Design

- Traditional systems development life cycle
- CASE systems development life cycle
- Object-oriented systems analysis and design

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## CASE Tools

- CASE tools are productivity tools for systems analysts that have been created explicitly to improve their routine work through the use of automated support.
- Reasons for using CASE tools
  - Increasing analyst productivity
  - Improving analyst-user communication
  - Integrating life cycle activities

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## Object-Oriented (O-O) Systems Analysis and Design

- Intended to facilitate the development of systems that change rapidly in response to dynamic business environments
- Analysis is performed on a small part of the system followed by design and implementation.
- The cycle repeats with analysis, design, and implementation of the next part and this repeats until the project is complete
- Focus is on the objects within a system and all aspects of this approach use the unified modeling language (UML) standard

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## Phases of the OO UML Approach

- Define the use case model (Chap. 2)
  - Use case diagram
  - Use case scenarios
- Create UML diagrams (Chap. 10)
- Develop class diagrams (Chap. 10)
- Draw statechart diagrams (Chap. 10)
- Modify the UML diagrams
- Develop and document the system

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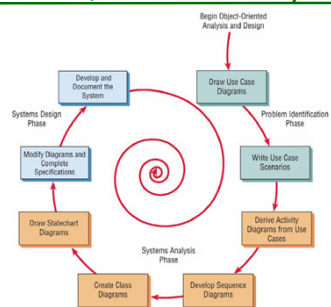
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## OO Approach also uses Iterative/Incremental Cycles



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## So many methods...

- You cannot use them all simultaneously...
  - You must choose **only** one!
- What must you consider?
  - Organizational culture? Customer?**
  - Interactive?
  - Incremental/Iterative?

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## Choosing SDLC

- Upper level management feels more comfortable or safe using SDLC
- Systems have been developed and documented using SLDC
- It is important to document each step
- There are adequate resources and time to complete the full SDLC
- Communication of how new systems work is important

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## Choosing OO Approach

- Choose OO UML:
  - The problems modeled lend themselves to classes.
  - An organization supports the UML learning.
  - Systems can be added gradually, one subsystem at a time.
  - Reuse of previously written software is a possibility.
  - It is acceptable to tackle the difficult problems first.

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## Summary

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## Questions?



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